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ABSTRACT

This program was used with more than 8,000 students (grades two through eight in New York City nonpublic schools) who were retarded in mathematics achievement. Seventy-seven special teachers were used, many of whom had never taught before and/or had no contact with disadvantaged children. Administrative procedures are discussed. The goals of the program were: (1) to improve classroom performance, (2) to improve self-image, (3) to promote a positive attitude change toward school, and (4) to improve daily attendance. At the end of the year's program, the subjects were somewhat more behind grade level than at the beginning, but no more so than the control group. Subjects were considered to have improved in attitude and attendance. (LS)

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CORRECTIVE MATHEMATICS SERVICES FOR DISADVANTAGED PUPILS IN NONPUBLIC REGULAR DAY SCHOOLS

Anne S. Grossman

Evaluation of a New York City school district educational project funded under Title I of the Elementary and Secondary Education Act of 1965 (PL 89-10), performed under contract with the Board of Education of the City of New York for the 1966-67 school year.

Committee on Field Research and Evaluation
Joseph Krevisky, Assistant Director September 1967

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DESCRIPTION OF THE PROJECT

In September 1966 the Corrective Mathematics program was introduced in nonpublic regular day schools in New York City. This project was designed to provide corrective services for disadvantaged children identified as retarded in arithmetic.

The objectives of the program, as stated in the official Board of Education description, included the following:

(1) To improve classroom performance in mathematics beyond usual expectations,

(2) To improve the children's self-image,

(3) To change (in a positive direction) their attitude towards school and education, and

(4) To improve the children's average daily attendance.

In the original proposal, 195 schools serving attendance areas with high concentrations of low-income families were selected to participate; approximately 30,600 children, one-third of the schools' total register, were estimated in advance to be eligible for the new program. Positions for 133 corrective mathematics teachers were allotted to the program.

In the basic program the teacher worked with small groups of approximately 10 pupils for two one-hour sessions a week. Since the instructional load had been set at 20 hours per week, each teacher was responsible for about 100 children. In most instances these children were not in one school; all full-time corrective teachers traveled from school to school, serving two or occasionally three schools.

The criteria of pupil eligibility for the corrective mathematics program were as follows: children in grades 2 through 4 were eligible if they were at least one year retarded in mathematics; in grades 5 through 8 the basis was at least two year's retardation. The program description did not specify how the degree of retardation was to be assessed. Eligible children not being served at the onset of the program were to be placed on waiting lists and accommodated as space became available; they would replace pupils whose mathematics deficiencies had been remedied, or who for other reasons were dropped from the program.

A full time coordinator, three clerical assistants, and five teachers assigned as field supervisors were to administer the corrective mathematics program. A special allottment covered the costs of supplies, materials, and equipment. Orientation and in-service training for the corrective teachers were incorporated in the proposal.

The program began in 135 schools in September 1966, with a full time coordinator, 66 corrective teachers, and three part time field supervisors. More schools were added to the program as more corrective mathematics teachers were recruited; by June, 154 or 79 per cent of the eligible schools were involved, and 77 corrective teachers had participated at some time. The program was not operative in 29 schools because of insufficient remedial staff, while 12 schools dropped out of the program due to space considerations or similar problems. The director of the program estimated that 8,625 children were served by the program during this first year.

EVALUATION DESIGN

The general design of the evaluation was based on the stated objectives of the program; the primary aim was to determine the extent to which the corrective program had alleviated the mathematics deficiencies of the pupils.

No norms and no expectancies are available for a population that needs corrective help; progress of the participating pupils could only be compared with the achievement expected for a normal child. Since the participating children were supposed to be one or two years retarded in mathematics at the start of the program, they could not be expected to progress at the normal rate. To provide at least some comparative information about expectancy for pupils progressing at a rate below normal, results for a sample of children who were not selected for corrective instruction were studied. A more complete description of these groups follows below.

In addition to an analysis of pupil achievement in arithmetic, a measure of pupil self-image and attitude toward school and education was obtained. Attendance records were evaluated, and the reactions of principals and classroom teachers to the program were studied. The corrective mathematics teachers were questioned and specialists in mathematics education observed corrective classes.

All data are presented by grade level only; no denominational analyses were made. Sex differences were analyzed, but since there were no differences in improvement at any grade level between boys

and girls, their results were combined.

Eligibility of Pupils for the Corrective Program

The official project description stated that eligibility for corrective mathematics classes was limited to children in grades two through four who were at least one year retarded, and to children in grades five through eight who were at least two years retarded in arithmetic. Children were selected for the program in various ways. The responses of the principals of the schools indicate that while about half the schools selected participants based on a combination of test results and teacher recommendation (48 per cent) about one-third of the schools based selection on teacher recommendation alone (30 per cent), even in those few cases where some form of test score was available in September. The remaining principals indicated use of report card grades and other formal and informal procedures.

Participation of all pupils judged eligible was limited by available facilities and personnel; in most instances the principals established priorities which varied among schools. These included giving priority to children below grade for age, to recent admissions, and to children having language difficulties or other problems in the classroom.

The Metropolitan Achievement Test in Arithmetic was given in November only to selected grades. In January when results of the November testing became available, in some schools pupils were dropped from

the program because their scores were higher than the eligibility limit. In other schools similar children were permitted to remain in the program. The director of the project together with school principals made the final decision on an individual basis.

Selection of Sample Schools for Analysis of Pupil Progress

One part of this evaluation focussed on pupil progress during the year. Such an analysis requires a standard baseline against which to measure changes in achievement. The only program-wide measure available for this purpose was the Metropolitan Achievement Test in Arithmetic. This test was given by the regular classroom teachers in November 1966; furthermore, the test was given only in selected grades, as follows:

New York Archdiocese Catholic schools, grades 3, 5 and 7.

Brooklyn Archdiocese Catholic schools, grades 3. 6, and 7.

Hebrew, Greek Orthodox, Lutheran, and Episcopal schools, grades, 3, 6, and 8.

The proportion of eligible children, as estimated in the original project description, in each of these three categories was, respectively, 44, 48, and 8 per cent. For an analysis of achievement data, a sample of 18 schools was selected by religious denomination from the 135 schools participating in the program as of November 1, 1966, so that it was representative of the total population of schools. Only schools where a corrective mathematics teacher had been assigned early in the fall were included. For efficiency in data collection, prefer-

ence was given to the larger schools within each denomination. Within these schools, the grades included in the achievement analysis were restricted to those for which November scores were available, as listed above; there were so few scores available for grade 8 that is was eliminated from consideration. Three of the 18 schools later had to be excluded because directions for reporting test results were not followed. The final sample for the achievement analysis thus consisted of data from the selected grades in 15 schools.

Selection of Sample of Children for Analysis of Pupil Progress

From the designated grades in the 15 nonpublic schools, a sample of pupils participating in the corrective program, to be referred to as the instruction group, was selected for more detailed study, in the following way. Two separate lists of names were used: listings by class of the November Metropolitan scores, and the corrective teachers' lists of children in corrective mathematics classes. Pupils whose names appeared on both lists, that is, pupils in corrective instruction for whom November Metropolitan Arithmetic scores were available, constituted potential members of the final sample for the instruction group. Pupils who were later dropped from the program whether because of ineligibly high scores, alleviation of their retardation, or other reasons, were also dropped from this sample. The remaining pupils who were still in corrective instruction in May 1967 were retested at that time by their corrective teacher. Table 1 summarizes

for all schools combined the number of pupils by grade in the final instruction group sample; the total number was 252.

After the designation of the instruction group sample, there remained in the same classes other children who received low scores on the November Metropolitan Arithmetic Test but who were not placed in corrective instruction despite their retarded test scores. It was decided to examine the performance of these children; they constituted the potential members of what will be referred to as the low scoring group. Any child who was placed in corrective instruction at any time during the year was eliminated from this group; the remaining children who were still in school in May were retested by the corrective teacher at the same time as the children in the instruction group sample. The final total in the low scoring group was 200 (see Table 1).

Table 1

Instruction and Low Scoring Groups: Number of Pupils

By Grade, all Schools Combined

Grade	Instruction Group	Low Scoring Group
3	66	49
5	82	62
6	44	36
7	60	53
Total	252	200

Since assignment and placement of children in corrective classes was not random, but was determined by teacher judgment within the limits of the priorities established by the principals, it was not possible to obtain a matched group for comparison with the instruction group. It is clear that the low scoring group cannot be considered equated with the instruction group sample. Children in the two groups are known to be alike in just two respects: they had the same classroom teacher and had low test scores, as will be shown later. The groups may have been unalike in many ways that are not specifiable; however, one important difference is specifiable. For each child a decision was required either to place him in corrective instruction, or not to so place him. A strong possible inference to be drawn from this is that more pupils who presented overall behavior problems as seen by the classroom teacher were recommended for instruction. Since space in the corrective classes was limited, these decisions necessarily involved the setting of priorities, and test scores were obviously not the only criterion for the decisions. But it can be definitely stated that a child's presence in the instruction group sample reflects a judgment that he was more in need of special small group (corrective) help than a child in the same class who is in the low scoring group.

Since little information is available about expectancy rates for the progress of children whose arithmetic test performance is below the norm, and recognizing the nonequivalence of the two groups, results will be presented for both the instruction and the low scoring groups,

with the aim of providing information about possible achievement differences between the two groups, and information that may prove helpful in future program design.

DESCRIPTION OF INSTRUMENTS

The evaluation instruments included, in addition to the Metropolitan Achievement Test in Arithmetic, three forms used only in the selected sample of schools and with the two selected groups of pupils; these were the "Observer's Report" of school visits by specialists in mathematics education, the "Pupil Questionnaire" for securing self-ratings by the selected pupil groups, and a parallel classroom teacher's rating scale for the same pupils (see Appendix B). Two other instruments were sent, respectively, to all principals (see "Principal's Questionnaire) and to all corrective teachers (see "Corrective Teacher's Questionnaire") participating in the program. The instruments are described in more detail below.

Metropolitan Achievement Test in Arithmetic

This test consists of two subtests: arithmetic computation, and problem solving and concepts. In November 1966, Form C of the Metropolitan was administered in nonpublic schools to all children in the selected grades listed previously. This was a machine-scored, multiple choice form; results of this administration were not available until January 1967.

In May 1967 a hand-scored form (Form A) of the Metropolitan Achievement Test was readministered by the corrective teachers to pupils in the corrective program at that time. With the cooperation of the project director, the evaluation team also arranged for re-testing of the low scoring group; names of children previously selected as potential members of this group were supplied to the corrective teachers with instructions to test all those who had not been in corrective instruction during the year. All May 1967 tests were scored by the corrective mathematics teachers or by the members of the evaluation team. Both November and May test results were obtained for a total of 452 pupils in four grades in 15 schools.

Pupil Self-Rating Scale

A brief pupil questionnaire, also administered in May 1967 by the corrective teacher provided some information about the child's self-image, arithmetic accomplishments, and attitudes toward school in general and toward mathematics in particular (see Appendix B); in addition to indicating likes and dislikes, pupils were asked to rate changes in themselves from "the beginning of the year to today." The scale was completed by 210 children in the instruction group and 161 children in the low scoring group, a total of 371 pupils.

Classroom Teacher Questionnaire for Selected Pupils

The regular classroom teachers of the two selected groups of

pupils were asked to provide information about and rate these children (see Appendix B). The classroom teachers evaluated the pupils in relation to school and to arithmetic, and rated the amount of improvement they showed in 16 behavioral areas. Some of the items in the teacher's questionnaire correspond directly to items in the pupil self-rating scale. Classroom teachers completed these questionnaires for 177 instruction group pupils and 159 low scoring pupils, a total of 336 pupils.

Pupil Attendance

On her questionnaire the classroom teacher was also asked to indicate, for each child, the number of absences in October 1966 and April 1967. It was hypothesized that any changes between these two periods, one near the beginning and the other near the end of the school year, might be related to the effects of the corrective program. In many instances teachers made no entry; since it was not clear whether no entry meant no absence, these cases were eliminated from the attendance analysis. The total number of children for whom both October and April data were available was 285.

Principal's Questionnaire

A survey questionnaire (see Appendix B) was mailed in April to the principals of all 154 schools participating in the project as of January 1967. Responses were obtained from 126, or 82 per cent of

them. This questionnaire was designed to elicit information on selection policies, continuity of corrective services, interactions between corrective teachers and school faculty and administration, as well as reactions to and suggestions for future modification of the corrective mathematics program.

Questionnaire for Corrective Mathematics Teachers

A questionnaire was mailed to all 77 corrective mathematics teachers, and was returned by 65, or 84 per cent of them. The five sections of the questionnaire (see Appendix B) included: (1) identifying information - sex, age, license held, prior teaching experience, and educational background; (2) teaching practices - ways of measuring the child's growth and progress, teaching techniques, etc.; (3) conditions in the schools - description of working area, storage space, scheduling of small groups, and communications with the classroom teachers; (4) supervisory assistance; supplies, materials, and equipment; adequacy of preparation for remedial teaching; and (5) recommendations and commendations.

Observations of Corrective Mathematics Classes

Three specialists in the teaching of mathematics visited 16 of the selected sample schools during March and April and observed corrective sessions at all grade levels. They used a standardized instrument (see Appendix B) to record their observations, including an evaluation of the physical environment, the degree of pupil inter-

est and involvement, general teaching performance, and the adequacy and appropriateness of the lesson and of the materials.

At these visits the observers talked to pupils in the corrective classes, and held separate conferences with the principal and with the corrective mathematics teacher. In general these conferences expanded the information and reactions obtained by questionnaires.

FINDINGS

The findings will be presented in three subsections. The first section will deal with information about the implementation of the program, including selection of pupil participants, size of corrective classes, length of sessions, materials and equipment, and data about the teacher participants. The second section will concentrate on the effects of the program on pupils' achievement in arithmetic, their self-image, and school attendance. The third section will summarize reactions to the program by principals, corrective teachers, and pupils.

THE IMPLEMENTATION OF THE CORRECTIVE MATHEMATICS PROGRAM

As previously indicated, the program started in September with a total of 66 teachers; by the end of the first year 77 teachers were involved in corrective classes in mathematics.

In examining the background and experience of the corrective teachers, what was immediately obvious was the lack of prior teaching

experience: of the 65 teachers who returned questionnaires, 44 (68 per cent) had never taught before, although half indicated some part time nonteaching experience with disadvantaged children.

Sixty per cent, or 39 of the respondents had never taken a methods course in the teaching of mathematics. A total of six teachers in the 15 sample schools could be designated as having a mathematics background. These included one college mathematics major and five others who had mathematics, accounting, or statistics minors, or enough college credits in mathematics to consider it a minor.

Interestingly enough, however, teacher background in mathematics, as indicated by the number of college credits, does not appear to be an indicator of success in teaching corrective mathematics. In the section of the report on achievement tests, the results of an analysis of pupil performance in relation to teacher background will be presented in detail.

School Assignment, Working Space, and Supervision

The data indicate that most corrective teachers were assigned to two schools, visiting one twice a week and the other three times a week. A few teachers worked in three different schools. In those instances where a school was eligible for more than three days of service per week, a second teacher was assigned; there were only two schools in which two different teachers were assigned.

In response to the questionnaire, all but six of the 65 cor-

rective teachers felt welcome and comfortable in the schools to which they were assigned and indicated that they would like to return to the same schools. There were a few exceptions: three teachers were not planning to return next year; 13 others requested a change in at least one of their schools, three of these because of the distance from home to school.

In most schools conditions were crowded. In 45 per cent of the observed schools a special room was arranged for corrective classes. Other arrangements included the use of shared rooms, cafeterias, auditoriums,and other makeshift space. It was generally agreed that although schools were crowded, some preplanning might have alleviated some of the space problems. For example, in one school the corrective mathematics teacher, the corrective reading teacher, and the speech teacher were all scheduled to be present on the same day.

The original plan called for five field supervisors; the program actually operated with only three part time field supervisors in addition to the project director. As a result, supervision was somewhat inadequate in view of the limited experience of these teachers; 16 per cent of them received only one supervisory visit; 37 per cent were seen twice, and 28 per cent three times during the year. A few who evidenced difficulty were seen more often; one teacher was visited six times.

Length of Sessions and Size of Corrective Classes

The director of the program allowed for some flexibility in

arranging size of classes and length of sessions. Based on interview, observation, and questionnaire responses, it was found that in some schools both the principals and the corrective teachers desired smaller groups for shorter sessions; this was especially so for the younger children. It was felt that young children might benefit more from a half-hour session in groups of five, and in some schools schedules were rearranged in this way.

Materials and In-Service Orientation

Special instructional equipment and supplies and kits of materials for children's use, an integral part of the program, did not arrive in the schools until January, and in some instances February 1967.

In the interim, the Board of Education furnished temporary materials (primarily mimeographed drill exercises); after examining these materials the observation team concluded that unless the corrective teacher had an understanding of, and previous training in, arithmetic concepts and methods of teaching, these materials were not of much value. Teachers indicated a need for structured directions for teaching; only one teacher felt that she had been well provided with adequate curricular materials.

Once the special materials arrived they were found useful by the teachers and valuable by the principals. The main concern was that there were not enough workbooks for each child's individual use.

In addition, there was some concern that the kits were inappropriate for the upper elementary grade children. The corrective mathematics teachers were given instruction in the use of the materials. When the observers went to the schools in the spring, they saw the materials being used in every class they visisted. However, they noted that although some teachers used the materials in creative and resourceful ways, others did not always make the best use of the materials provided.

The Board of Education provided lectures and seminars for the orientation and instruction of the corrective mathematics teachers. The sessions included demonstration of the use of materials and instruction in how to teach. The teachers commended the demonstration lessons given by the program director and the training in use of equipment and visual aids; two lessons in particular were mentioned frequently as providing the kinds of information the teachers indicated they needed. These were lessons on the teaching of division and on the teaching of place value. Sessions devoted to general lectures on mathematics were rated less relevant to their needs.

The responses of the corrective teachers indicated that they desired more specific instruction in how to teach key concepts and topics; 92 per cent of them expressed a need for help in how to teach mathematics; only five teachers felt they needed no help.

Procedures Used in Selection of Pupil Participants

The recommendation and placement procedures that were developed raise the question of whether, in addition to being below grade level in arithmetic, the instruction group children were experiencing other difficulties as well. While there is no evidence about the number or extent of emotional or physical problems, the fact that they (and not other low scorers) were selected for the corrective mathematics program, or given priority, is suggestive.

Table 2 summarizes the classroom teacher's response to the question, "Does this pupil need special help to learn?" More than three-fourths of the children in instruction were rated by their classroom teacher as needing special help, whereas 56 per cent of the low scorers received this rating. Because of the ambiguity in the question, the criteria used by the teachers in making these judgments can only be inferred. This evidence suggests only that classroom teachers were more likely to view the instruction group children as needing more help than could be obtained in the regular classroom.

Table 2

CLASSROOM TEACHERS' JUDGMENTS ABOUT CHILDREN'S NEED FOR SPECIAL HELP

Response to Question	Instruction Group		Low Scoring Group	
	N	Per Cent	N	Per Cent
"Yes"	137	77.4	84	56.4
"No"	40	22.6	65	43.6
Total Responses	177	100.0	149	100.0

The instruction group did not contain a larger percentage of pupils attending other remedial or after school programs than did the low scorers not in instruction; 22 per cent of the total group was also in corrective reading and another five per cent were attending after school centers. A few children in mathematics instruction were receiving counseling services as well.

EFFECTS OF THE CORRECTIVE MATHEMATICS PROGRAM ON PUPIL ACHIEVEMENT

The Metropolitan Achievement Test results for the instruction group, tested in November 1966, and again six months later in May 1967, are presented for the two subtests in Tables 3 and 4. Table 3 shows the mean grade equivalent scores by grade for the Arithmetic Computation subtest and Table 4 shows the results for the Problem Solving and Concepts subtest. Tables 5 and 6 show the results for the low scoring group on the two subtests. Included in these tables is a change score, which indicates the progress made in the six months between test administrations, and a deviation score, which is the discrepancy between

Table 3

PERFORMANCE OF INSTRUCTION GROUP ON ARITHMETIC COMPUTATION SUBTEST: MEAN GRADE EQUIVALENT SCORES, NOVEMBER 1966 AND MAY 1967

Grade	N	November 1966		May 1967		Mean Change 11/66-5/67
		Mean Score	Deviation from Norm	Mean Score	Deviation from Norm	
3	66	2.6	- .6	3.2	- .6	+ .6
5	82	4.5	- .7	4.7	-1.1	+ .2
6	44	5.5	- .7	5.6	-1.2	+ .1
7	60	5.7	-1.5	5.7	-2.1	0

actual performance and grade level expectancy. The anticipated normal amount of growth in arithmetic is one month for each of the ten school months; for example, average third graders tested in November are expected to obtain a grade equivalent of 3.2 on each subtest; by May, their score is expected to be six months higher, or 3.8.

Children in corrective instruction in grades 3, 5,and 6 showed improvement in computational skills between November and May. Children in the seventh grade showed no improvement. As can be seen in Table 3, the greatest change occurred in the third grade; these children gained six months in computational skills during the six month interval between test administrations. In the fifth and sixth grades, the instruction group children showed only a slight gain; and for the seventh grade pupils in instruction the mean grade equivalent score was the same in May as it had been in November.

With the exception of the third graders, all other grades were further below normal grade level on the computation subtest in May than they had been in November. Because the seventh graders evidenced no growth on this subtest, they were furthest behind expectancy; in November the seventh grade children were achieving 15 months below grade level and by May they were 21 months retarded in arithmetic computation.

Table 4 summarizes the results for the instruction group on the problem solving and concepts subtest. Children in grades 3 and 5 receiving corrective instruction gained six and five months, respectively, between November and May. Fifth and seventh graders performed more

Table 4

PERFORMANCE OF INSTRUCTION GROUP ON PROBLEM SOLVING AND CONCEPTS SUBTEST: MEAN GRADE EQUIVALENT SCORES, NOVEMBER 1966 AND MAY 1967

Grade	N	November 1966 Mean Score	November 1966 Deviation from Norm	May 1967[a] Mean Score	May 1967[a] Deviation from Norm	Mean Change 11/66-5/67
3	66-65[a]	2.6	- .6	3.2	- .6	+ .6
5	82	4.4	- .8	4.2	-1.6	- .2
6	43-41[a]	4.8	-1.4	5.3	-1.5	+ .5
7	60	5.8	-1.4	5.5	-2.3	- .3

[a] May frequencies lower than November grade totals.

poorly on this subtest in May than they had in November. Although the third graders again exhibited the greatest absolute growth, they remained six months below normal expected grade placement.

It is interesting to note the consistency of the relationship between grade and deviation from expectancy; on both subtests, as grade level increased there was an increased deviation between expectancy and actual performance. Except for third graders, who achieved the normally expected six months' progress, all other grades showed an increase in retardation from November to May. This finding suggests that the type of corrective instruction provided by the program may be most efficacious at the third grade level.

Table 5 presents the mean grade equivalent scores on the November and May administrations of the computation subtest for children

Table 5

PERFORMANCE OF LOW SCORING GROUP ON ARITHMETIC COMPUTATION SUBTEST: MEAN GRADE EQUIVALENT SCORES, NOVEMBER 1966 AND MAY 1967

Grade	N	November 1966		May 1967		Mean Change 11/66-5/67
		Mean Score	Deviation from Norm	Mean Score	Deviation from Norm	
3	49	2.3	- .9	3.2	- .6	+ .9
5	62	4.3	- .9	4.7	-1.1	+ .4
6	36	5.2	-1.0	5.5	-1.3	+ .3
7	53	5.9	-1.3	6.5	-1.3	+ .6

in the low scoring group. With the exception of the seventh grade, the low scoring children performed more poorly on the initial administration of the test than the instruction group. By May 1967, grades 3 and 5 gained nine and four months, respectively, and were achieving at the same mean level as the instruction group. In relation to normal expectancy, only the third graders were less retarded in May than they had been in November. The low scoring sixth graders, who gained three months during the six month interval, were in fact one month more retarded in May than the sixth grade instruction group. The seventh grade low scoring group was achieving eight months in advance of the seventh grade instruction group, but remained 13 months below normal expectancy.

The mean scores for the low scoring group on the problem solving and concepts subtest are summarized in Table 6. In initial problem solving and concepts ability, the low scoring children in

PERFORMANCE OF LOW SCORING GROUP ON PROBLEM SOLVING AND CONCEPTS SUBTEST: MEAN GRADE EQUIVALENT SCORES, NOVEMBER 1966 AND MAY 1967

Grade	N	November 1966		May 1967		Mean Change 11/66-5/67
		Mean Score	Deviation from Norm	Mean Score	Deviation from Norm	
3	49	2.6	- .6	3.1	- .7	+ .5
5	62	4.2	-1.0	4.4	-1.4	+ .2
6	36	4.7	-1.5	5.4	-1.4	+ .7
7	53	6.0	-1.2	6.5	-1.3	+ .5

grades 3, 5, and 6 scored as poorly as or more poorly than the children in corrective instruction. Only the seventh grade group was less retarded initially than the instruction sample. However, during the interval between testings the low scoring children not receiving instruction tended to make greater absolute gains than did the children in instruction group, and tended to be less retarded by May than the instruction group. It is important to note, however, that the low scoring children in all grades except grade six exhibited an increase in retardation. That is, despite their gains on the problem solving and concepts subtest, these pupils were achieving further below grade level in May than they had been in November.

In summary, children in the low scoring group generally demonstrated greater improvement in arithmetic computation and problem solving, as measured by the Metropolitan Achievement Test, than the children in corrective instruction, although neither group was achieving

at a normal level at either testing. Among the children in the instruction group, on both subtests third graders tended to make greater gains than did the children in the higher grades. In addition, the third grade was the only one of the grades that maintained its relative standing with respect to normal expectancy; grades 5, 6, and 7 exhibited increased retardation from November to May. It is interesting to note that in general the pupils who were not receiving instruction also tended to exhibit an increase in retardation; with few exceptions they too were relatively more retarded in May than they had been in November.

Corrective Teacher's Mathematics Background and Pupil Progress

This section will explore the relationship between a corrective teacher's background in mathematics and her pupils' school achievement as measured by pupils' scores on the Metropolitan test. Of the corrective mathematics teachers in the 15 sample schools, six were designated as having a background in mathematics; as previously described, these six teachers had majored or minored in mathematics while in college. The other nine corrective teachers in the sample schools had from 0 to 12 college credits in mathematics.

The data for both subtests appear in Appendix A, Table 1. Because of the small number of cases per teacher, grades were combined to compute these means. Teachers are listed in order of success of their instruction group students on the computation subtest as measured

by their pupils' change from November to May. Teachers mathematics backgrounds are given as well as the grades in the sample taught by each. The mean growth or decline from November to May for both the computation and problem solving subtests is shown in the table.

It was found that students whose corrective teachers studied little or no mathematics in college showed significantly better results on the computation subtest than students who were helped by the six teachers with good mathematics background. The mean growth from November to May for instruction group students having teachers with no or little college mathematics was four months, while the mean change for students taught by teachers with 14 or more college credits in mathematics was zero. The teacher whose students showed the most improvement in computation, a seven month gain, had had less than 14 mathematics credits (see Appendix A, Table 1). The teacher whose students did most poorly - a loss of 13 months, had had a mathematics minor; however, it must be noted that this result was confined to seventh graders.

There was much variation in mean growth on the problem solving and concepts subtest among schools. The mean change was as high as a gain of 13 months for one teacher and as low as a loss of seven months for another. There was no significant difference between mean changes on the problem solving subtest of those students taught by teachers who had good college mathematics backgrounds and teachers who

did not have such backgrounds.

The table shows that of the six teachers whose students ranked highest on the computation subtest the students of four also displayed the best mean growth on the problem solving subtest. Five or six teachers in these schools had little or no college mathematics backgrounds. Four of the six teachers whose students showed the least gains on the computation as well as on the problem solving subtest had mathematics backgrounds.

The above findings suggest that: (1) when a teachers' pupils showed growth in the computation subtest, they also showed corresponding growth in problem solving; (2) a teacher's background in mathematics as measured by the extent of her college training in the subject is not an indicator of success in teaching corrective mathematics. It can be generalized that teachers who were relatively successful in teaching computation skills were also relatively successful in teaching problem solving skills; and that knowing higher mathematics from studying it at the college level may adversely affect teaching in the corrective program. The latter generalization is, however, tempered by consideration of the grade levels of any one teacher's students available for this analysis; students of the teachers with a good mathematics background included very few third graders, who overall made the greatest progress.

Attendance

Children in instruction had fewer absences at the end of the

school year than at the beginning. The number of days absent in October and April was requested from the classroom teacher for each child in the instruction and the low scoring groups. Difference scores were obtained by subtracting the April absences for the October absences.

Table 2, Appendix A, summarizes the mean differences by grade for the instruction and the low scoring groups; a positive mean indicates improved attendance. Pupils in the instruction group showed significantly greater improvement in attendance than the low scoring group. The actual change however, was slightly less than one day improved attendance. Every grade, 3, 5, 6, and 7, showed positive changes; the sixth grade had the least improvement in attendance. With the exception of the low scorers in grade 7, there was no improvement in classroom attendance for the low scoring pupils; in fact, the average number of days absent for third, fifth, and sixth graders was higher in April than in October.

Attendance data should be interpreted cautiously, for the figures reflect pupil illness, bad weather, etc., as well as pupil satisfaction, achievement, and interest.

Pupil Attitudes

Although the reputed relationship between attitude and achievement rests primarily on anecdotal evidence, consideration was given to pupil attitudes both in the objectives and in the evaluation of

the corrective mathematics program.

Data obtained from the pupils' questionnaires indicated a positive attitude toward school and mathematics: 55 per cent of the instruction group rated school "the greatest," and only 13 per cent thought that school was "not so good." The two corresponding figures for the low scoring group were 47 per cent and 21 per cent. The difference between the groups was most pronounced at the third and seventh grade levels; fewer seventh and more third graders in the instruction group rated school better than did the seventh and third graders in the low scoring group.

In exploring pupil attitudes toward mathematics in general, the same pattern obtained; more children in the instruction group liked mathematics "a whole lot." Three-fourths of the third grade group in instruction responded this way, whereas only 48 per cent of the low scoring third graders liked mathematics "a whole lot."

Pupil self-ratings of improvement in attitude and teachers' ratings of the same pupils were compared. The results are summarized in Table 7 on the following page. The table contains the mean score, by grade, of six items from the pupil questionnaire which clustered together on a factor analysis, and 12 items of the classroom teacher's questionnaire.[1] A smaller numerical value represents a more positive rating.

---

[1]The six pupil items were: "volunteering to do arithmetic examples; understanding the teacher when she teaches arithmetic; getting correct answers; not giving up when arithmetic gets too hard; liking arithmetic; getting homework done." The teacher's score is based on the same six items plus "doing dividing, subtracting, adding, multiplying; marks on tests; and pupil pays attention."

Table 7

MEAN SCORE, BY GRADE, OF PUPILS' SELF-RATED IMPROVEMENT (MEAN OF SIX ITEMS) AND TEACHERS' RATINGS OF PUPIL IMPROVEMENT (MEAN OF 12 ITEMS)[a]

Grade	Instruction Group		Low Scoring Group	
	Self-Rating	Teacher Rating	Self-Rating	Teacher Rating
3	1.6	2.5	1.7	2.4
5	2.1	2.6	2.4	2.4
6	2.1	2.5	2.2	2.0
7	2.6	2.5	2.5	2.6

[a]The smaller the numerical value, the more positive the rating.

Pupils in the instruction group tended to rate themselves as somewhat more improved than the group of low scorers, although their teachers rated their improvement less highly. Third graders rated themselves as more improved (between 1, greatly improved, and 2, improved) than did pupils in the higher grades.

A study of attitudes was made for those children who showed the least progress in arithmetic achievement. Five children in instruction from each of the four grades, and five low scorers in each of the four grades were selected on the basis of least progress on the Metropolitan computation subtest. Self-ratings and teachers' ratings of pupil attitude were analyzed. Teachers rated more instruction group children than low scorers as having a positive attitude toward arithmetic; the pupils in instruction also tended to rate themselves more positively than did the low scoring group. The pupils in the in-

struction group rated themselves as having confidence in their ability to compute (multiply and volunteering to do arithmetic examples), even though they did not improve in achievement as measured by the Metropolitan.

These findings suggest a hypothesis for further study: changes in achievement will not be demonstratable, i.e., will appear only after, changes in attitudes are firmly established.

REACTIONS OF THE PERSONNEL INVOLVED IN THE PROGRAM

Corrective Mathematic Teachers

The corrective mathematics teachers generally were satisfied with the program. As already noted, they were satisfied with their school assignments and felt welcome by the school faculty. These teachers indicated that for the most part they would be willing to work in the same schools next year. They also felt that they learned a great deal themselves and that they were successful in establishing rapport with the children with whom they worked.

The corrective teachers indicated certain weaknesses. The lack of supervision and training in teaching techniques was a major concern of the majority of the respondents. In addition, the scheduling, crowded conditions, and lack of work and storage space were all mentioned. They tended, however, to be enthusiastic about the program, commended the program director, and felt they were providing the chil-

dren with needed attention and help.

Principals

Eighty-two per cent of the 154 principals responded to the questionnaire. Principals expressed overall satisfaction with the program, and except for one principal, all were eager to have the program continue; 11 principals asked for expansion of services to enable more children to participate.

There were some criticisms about the quality of instruction and fewer criticisms about the corrective teachers. The principals were concerned with the inexperience of the teachers and the lack of supervision. Twenty principals were concerned that children had to leave their regular classrooms to spend time with an inexperienced and sometimes ineffectual corrective teacher. Three principals requested a different teacher in the future, while several wanted the same teacher to continue. However, it should be noted that 97 per cent of the principals rated the teachers as very reliable in attendance, and 92 per cent said that the interaction between the school faculty and the corrective teacher was good; 45 per cent of the principals mentioned the teacher's cooperativeness.

Eighty-five per cent of the principals visited the corrective classes at least once; due to a lack of communication between the administrators of the program and the schools, 15 per cent of the principals thought they "were not supposed to visit the classes." The

comments of the 106 principals who did make visits ranged from praise (123 responses) to dissatisfaction (21 responses). Only 42 per cent of the principals "liked what they saw" and another 10 per cent commented on the good discipline and control. A sample of their comments follows: 'Teacher always busy with the children, held their interest, and children enthusiastic about their work; teacher was working with the children, there was order but no strain; there was an attitude of respect and rapport.

On the other hand, the 21 unfavorable responses included: No control of situation; lifeless presentation; very little being done; children's work left around, no record keeping - seldom corrected and returned; planning time spent reading newspapers; poor coordination between regular curriculum and work done in the corrective classes.

Principals were asked to report how the parents and faculty responded to the program. These data appear in Table 3, Appendix A. Ninety-three per cent of the principals reported that the classroom teachers were in favor of the program. The nature of the teachers' commendations was related to improved pupil performance in mathematics in the classroom. The principals reported that 80 per cent of the parents were in favor of the program, mentioning their children's improvement in mathematics.

More than 95 per cent of the principals favored the program, and 71 principals felt certain that the children benefitted from the

instruction in small groups. Twelve principals were concerned with the curriculum for upper grade students which "spent too much time drilling fundamentals and didn't help the children with the topics being covered in their regular classrooms." Two principals wanted to take greater responsibilty for the program, and four others wanted "more flexibility" in selection and placement. Eleven principals asked for smaller groups for shorter time periods, and 16 principals noted the fine equipment made available.

In summary, the principals were generally satisfied with the program as a whole but had reservations about the quality of the teaching.

Observers

The specialists in mathematics education who observed a sample of corrective classes substantiated the information obtained by teacher and principal questionnaire and interview. Although physical conditions and facilities varied, approximately half the 16 schools visited provided a special room and storage space for corrective classes, while in other schools teachers worked in less adequate makeshift space.

The teachers were rated differently in their enthusiasm for and ability to teach corrective mathematics; the observers noted that about three-fourths of them worked hard, and several used techniques which were highly commended. Other teachers were less enthusiastic and the observers indicated that this was reflected in their teaching.

Principals, pupils, and corrective teachers were interviewed by the evaluation team of mathematics specialists. The younger pupils in particular felt they were learning arithmetic, but the seventh and eighth graders were concerned with the loss of time from regular classes and the discrepancy between the corrective class curriculum and what was being taught in their classrooms. Obviously, third grade children, whether they are in corrective or regular classes, will be learning the basic computational aspects of arithmetic. For seventh and eighth graders however, this is not the case; those in corrective classes still need help with fundamentals and must also learn more advanced concepts in their regular class.

The principals' satisfaction with the total program was related to the amount of satisfaction they had with the specific teacher assigned. In those cases where the corrective teacher was not highly rated by the principal, the principals' reaction to the overall program was not satisfactory.

Corrective teachers who were interviewed during the observational visits all said they were in favor of the corrective mathematics program and expressed the belief that they were providing the pupils with the attention and help they needed, although several did mention problems. The difficulties they encountered included their own inexperience, the lack of supervision, and discipline and language problems in relation to the children.

SUMMARY AND RECOMMENDATIONS

The Corrective Mathematics program was introduced in 135 non-public regular day schools in September 1966 with a staff of 66 corrective teachers and three part time supervisors and a project director. Despite the difficulties of recruiting staff and providing adequate instructional space, supervision, and materials and supplies, it was estimated that by June the program was operative in 154 schools and that 8,625 pupils were served during the first year.

Size of classes and length of sessions were adapted to meet the needs of the pupils. Temporary remedial materials, although judged inappropriate, were provided to fill the gap between the start of the program and the arrival of special corrective materials. Teachers were enthusiastic about these special supplies but did not always use them to best advantage. Some attempt was made at in-service orientation, but more frequent and more specific direction appeared necessary. The teachers were for the most part inexperienced and had little formal training in mathematics or methods courses.

The pupils selected to participate were chosen primarily on the basis of teacher recommendation. The third-, fifth-, and sixth-grade samples of children in corrective instruction averaged about 6 or 7 months retarded in arithmetic as measured by the Metropolitan Achievement Test in arithmetic.

The seventh-grade group was initially 15 months below grade

expectancy. By the end of the program year, on the May administration of the computation subtest of the MAT, all grade groups with the exception of grade three were more retarded, that is, further behind grade expectancy, than they had been in November. Because of the assumption of normal progress inherent in the concept of grade expectancy, data were collected for another group of low scorers in mathematics; these children were from the same regular classrooms but were not recommended for corrective instruction. Results were comparable for this group; only the third graders were not more retarded in May than they had been in November.

Children in corrective instruction in all grades improved somewhat in classroom attendance and in attitudes toward school and toward arithmetic.

In general the program was considered satisfactory by the principals and corrective teachers although teacher inexperience and the quality of instruction were often mentioned as difficulties.

Recommendations

It is recommended that children be referred for this program when their primary deficiency is in mathematics. When pupils can be characterized as being generally slow learners, or as having emotional difficulties, they belong in a program specifically designed to meet those needs.

For each participating child the classroom teacher should provide a profile specifying difficulties in mathematics, both for diagnostic and research purposes. The standardized achievement test should be investigated as to appropriateness both as a selection and as a diagnostic instrument. The timing of the test administration and the scoring should be spaced so as to allow its use for diagnostic purposes. Perhaps a hand-scored rather than a machine-scored multiple choice form of the test could be substituted so that the processes pupils use in arriving at their answers may be studied.

If an evaluation is to provide information about the effectiveness of a program in relation to pupil achievement, some comparative information is indispensable. Whenever there are not enough personnel to serve all eligible children, some consideration should be given to a random assignment of eligible pupils to a corrective and a control group. The selection procedures and the priorities for placement in the program described in this report negated the possibility of obtaining data for a comparable control group.

The achievement results suggest that the program was most effective at the early grade levels; if there are not enough personnel to serve all eligible children, corrective instruction should be concentrated in the early grades. A followup study is indicated to determine whether these children can maintain the progress they exhibited.

A greater emphasis should be placed on adapting the corrective curriculum for the pupils in the upper grades so as to decrease the

disparity between what is being taught in their regular classes and what is being taught in the corrective classes.

Changes in pupil attitudes occurred during this school year, but great changes in academic performance in arithmetic were not immediately apparent. It is recommended that a followup study be undertaken to determine if, after better pupil attitudes are firmly established, these will result in improved achievement in mathematics.

It is recommended that greater effort be directed to the mechanics of implementation of the program. Specifically, more attention should be paid to preplanning and scheduling of corrective classes to permit better utilization of the limited space in the nonpublic schools. In addition, some effort should be made to assure prompt delivery of supplies and equipment. It is also suggested that there be greater flexibility in arranging the size of classes and the length of sessions in order to meet the different needs of the pupils.

Although the results suggest that college training in mathematics is not an indicator of success in teaching corrective arithmetic, training in the methods of teaching the fundamental concepts of arithmetic to children is indicated. If it is not possible to recruit teachers with this type of background, then the in-service training should stress methods and techniques of teaching.

All personnel in the program saw the need for more regular and more frequent supervision of the corrective mathematics teachers.

This would necessitate the assignment of more field supervisors as well as a continuous training program that should be maintained throughout the year. The training program should include:

a. methods of grouping and working with groups,

b. lesson planning and sequential development of topics,

c. use of visual aids and programmed materials,

d. knowledge of content by grade level.

These methodological and content objectives can be met through increased demonstration lessons by the program director and supervisors; exchange of successful ideas; opportunity to work with specific and appropriate materials; and instruction in providing corrective help while allowing progress in regular grade content.

APPENDIX A

TABLE 1

MEAN CHANGE SCORES ARRANGED IN ORDER OF GREATEST TO LOWEST ACHIEVEMENT PER TEACHER ON COMPUTATION SUBTEST (Grades Taught by Teacher and Teacher Background in Mathematics Also Shown)

School and Teacher[a]	Teacher Background	Grades	N	Change from Nov. - May: Computation Mean	Change from Nov. - May: Problem Solving Mean
A	No Math	3,6,7	32	+ .7	+ .4
B	No Math	5	10	+ .7	- .1
C	No Math	3,5,6	22	+ .5	+ .2
D	No Math	3,5	20	+ .4	- .3
E	Math	3,6	21	+ .4	+1.3
F	No Math	3,5	22	+ .3	+ .3
G	Math	7	8	+ .3	- .5
H	No Math	3,7	21	+ .2	+ .1
I	Math Major	5	23	+ .2	+ .1
J	Math Minor	5,6,7	27	+ .1	0
K	No Math	6	11	- .2	+ .2
L	Math Minor	5	19	- .3	- .7
M	No Math	7	6	- .5	- .5
N	Math Minor	7	7	-1.3	- .5

[a] One school was dropped from this analysis because results were available for only three children.

TABLE 2

MEAN DIFFERENCE IN DAYS ABSENT (OCTOBER MINUS APRIL) FOR INSTRUCTION AND LOW SCORING GROUPS BY GRADES[a]

	Instruction Group			Low Scoring Group		
Grade	N[b]	Mean Difference	S.D.	N[b]	Mean Difference	S.D.
3	43	+0.6	1.5	35	-0.1	1.7
5	56	+0.6	2.3	46	-0.1	2.5
6	11	+0.1	1.4	6	-1.0	1.6
7	45	+0.6	2.4	43	+0.5	1.4

a. A positive mean value indicates an improvement in attendance.

b. The number of cases represented in this table is much smaller than for the other data analyses because of the large number of missing attendance figures as supplied by classroom teachers.

TABLE 3

PRINCIPALS' REPORTS OF REACTIONS OF SELF, PARENTS, AND FACULTY TO THE CORRECTIVE MATHEMATICS PROGRAM

	Parents		Faculty		Principal	
	N	Per Cent	N	Per Cent	N	Per Cent
Enthusiastic	24	19	37	30	58	46
In Favor	75	61	80	63	62	50
Indifferent	13	11	3	2	3	2
Not in Favor	3	2	6	5	3	2
Do Not Know	10	8	0	0	0	0
TOTALS	125	100%	126	100%	126	100%

Appendix B - INSTRUMENTS

CORRECTIVE MATHEMATICS SERVICES FOR DISADVANTAGED PUPILS IN NON-PUBLIC REGULAR DAY SCHOOLS

List of Instruments

Observer's Report	B1
Principal's Questionnaire	B6
Teacher's Questionnaire	B8
Pupil Questionnaire	B14
Teacher Questionnaire for Selected Pupils	B16

Center for Urban Education
33 West 42nd Street
New York, New York 10036

Title I Evaluations

CORRECTIVE MATHEMATICS SERVICES PROJECT FOR DISADVANTAGED PUPILS IN NON-PUBLIC REGULAR DAY SCHOOLS

OBSERVER'S REPORT

School_____Address_____Phone_____

Corrective Teacher_____Principal_____

Date and Time of Visit_____Observer_____

I. CONFERENCE WITH PRINCIPAL

1. Did you have a chance to visit the corrective classes?

2. How did your faculty receive the program?

3. How did your faculty receive the corrective teacher?

4. How did your faculty accept the pupil movement?

5. Were the parents informed of the program?
(How did they respond to the extra help?)
If yes, how?

6. What do you see that is good in the program?

7. What changes would you like to see?

duration of class session	makeup of classes
number of visits	supervision
size of classes	teachers
materials used	

8. If the program continues, would you like your school to participate?
Why? Why not?

Note: On original questionnaires, questions calling for extended comments allowed considerably more space than is shown here.

II. CONFERENCE WITH PUPILS

1. When did you start coming to this class? When the teacher first came?

2. Why were you chosen to come?

3. Do you like this class? Why?

4. What did you learn in arithmetic in class this week?

5. Does the arithmetic you learn here help you do arithmetic in class? How?

   5a. If the class uses a notebook, ask to see child's notebook. Note work done at the beginning and now.

6. Does this teacher help you to do better in arithmetic? How?

7. Have you used any beads, blocks, cutout forms? If yes, do you like to use them? Why?

8. Do you like arithmetic better now since you have been coming to this class? Why?

9. Do you like school better now that you have been coming to this class? Why?

10. Do your parents know about this class? If yes, who told them? How do they feel about this special class?

11. Would you like to have a class like this next year?

III. CONFERENCE WITH CORRECTIVE TEACHER

1. Is this room assigned for every session?

2. Do you use this same format at each lesson?

3. How else do you give lessons to this class? Other grouping? Other methodology?

4. Do the children generally behave this way?

5. Do you feel your pupils are doing better in mathematics since they started? How do you judge this?

6. Do you and the classroom teacher have any contact?
   conference
   meetings
   notes exchanged

7. How was the first contact made?

8. How do you feel about the program (and its success)?

9. What changes would you like to see?

number of visits	duration of class session
size of classes	makeup of classes
materials used	supervision

10. Did you feel welcome and at ease at this school?

11. If this program continues would you like to be part of it next year? At this school? Another school?

IV. OBSERVATION OF THE LESSON

1. ROOM

_____classroom

_____ conference room

_____ other

Number of children_____

General appearance of work area

Physical facilities for the students

_____chairs with arms

_____chairs

_____desks

_____blackboard

Is this room used regularly?

2. PUPILS

behavior

interest

language barriers

attention

participation

materials used: workbook_____notebook____rexographed sheets_____

paper_____

Did pupils get restless toward end of session? Length of session?

3. TEACHER

_____poise

_____voice

_____vocabulary

_____rapport with pupils

4. LESSON

topic

presentation (planning, aim)

development of concepts (understanding and/or rule)

materials

class, subgroup, or individual work

records kept

V. GENERAL SUMMARY OF VISIT

Principal's attitude

Corrective teacher's attitude

Pupils' attitude

Pupils' behavior

Conditions of work

The class lesson

Center for Urban Education
33 West 42nd Street
N.Y., N.Y. 10036

Corrective Mathematics Services Project for Disadvantaged Pupils in Non-Public Regular Day Schools

Title I Evaluation

Evaluation Chairman: Dr. Anne S. Grossman

Principal's Questionnaire

School_____

Address_____

Corrective Teacher_____ Principal_____

Date_____

1. When did the corrective mathematics program start at your school? _____
_____

2. Was the corrective teacher of mathematics changed at your school this year?
_____Yes
_____No

3. How were the children selected for the corrective mathematics classes?
_____a. By standardized test scores. Which test?_____
_____b. By teacher recommendation.
_____c. By another method. Please specify:_____

4. Which of the following considerations for selection were given top priority? Check at least one.
_____a. Grade in school
_____b. Sex
_____c. Age
_____d. Number of years retarded in mathematics
_____e. Language difficulty
_____f. Other. Please mention:_____

5. How many times have you visited the corrective mathematics teacher?_____.
Were you pleased with what you saw?_____
Why?_____
_____

6. Regarding the corrective mathematics program:
   a. On how many days were the corrective classes cancelled because of teacher absence?_____
   b. Have you found the teacher(s) reliable?_____
   c. Generally speaking, how did the corrective teacher(s) work with the regular faculty members?_____
   _____
   d. Was there much interaction?_____

7. How do the parents feel about the corrective mathematics program?
   _____a. Enthusiastically in favor
   _____b. In favor
   _____c. Indifferent
   _____d. Not in favor
   _____e. Do not know

8. How does your faculty feel about the corrective mathematics program?
   _____a. Enthusiastically in favor
   _____b. In favor
   _____c. Indifferent
   _____d. Not in favor

9. How do you feel about the corrective mathematics program?
   _____a. Enthusiastically in favor
   _____b. In favor
   _____c. Indifferent
   _____d. Not in favor

10. Have you had any commendations of the program?_____
    a. From whom?_____
    b. What was the nature of the commendation?_____
    _____

11. Have you had any complaints about the corrective mathematics program?_____
    a. From whom?_____
    b. What was the nature of the complaint?_____
    _____

12. Would you like to have your school participate in the corrective mathematics program next year, if it is available?
    _____Yes
    _____No

13. What aspects of the corrective mathematics program do you like most?

14. What changes would you like to see in the corrective mathematics program?

Principal's Signature_____

Center for Urban Education
33 West 42nd Street
New York, N.Y. 10036

Corrective Mathematics Services Project for Disadvantaged
Pupils in Non-Public Regular Day Schools

Title I Evaluation

Evaluation Chairman: Dr. Anne S. Grossman

Questionnaire for Teachers of Corrective Mathematics Services

I. Identifying Information

1. Name _____
2. Sex
   _____ Male
   _____ Female

3. In what age group are you?
   _____1. Under 25
   _____2. 25-34
   _____3. 35-44
   _____4. 45-54
   _____5. 55 or more

4. Under which New York City teaching license are you working?
   _____1. Common branches regular
   _____2. Common branches substitute
   _____3. Early childhood regular
   _____4. Early childhood substitute
   _____5. Other; specify: _____

5. How many years have you taught prior to this year? _____

6. How many credits do you have in mathematics content courses?_____

7. How many credits do you have in methods of teaching mathematics?
   _____

8. What was your college major? _____

9. What was your college minor? _____

10. How many years have you worked with disadvantaged children? _____

11. Have you ever before taught low achievers in mathematics?
    _____1. Yes
    _____2. No

12. If you have any graduate credit -- what area? _____

II. Teaching Practices (You may mark more than one alternative).

1. How do you use your preparation hour each day?

2. How are individual groups arranged?
   _____1. Children from only one grade
   _____2. Children from 2 grades
   _____3. Children from 3 different grades
   _____4. Children all from one class
   _____5. Children all from 2 different classes

3. With each group, which of the following techniques do you use?
   _____1. Teach the whole group
   _____2. Teach small groups while other children wait their turn.
   _____3. Assign work to one group while you work with another group.
   _____4. Assist individual children while others wait
   _____5. Assist individuals while others do assigned work

4. Do you use different techniques with younger children than with older ones?
   _____1. No
   _____2. Yes; specify:

5. Did you prepare any visual materials?
   _____1. Flashcards
   _____2. Bead or other counting device
   _____3. Games
   _____4. Other; specify:

6. Did you insist that each child keep a notebook?
   _____1. Yes
   _____2. No

7. Did you keep records to indicate each child's progress toward reaching grade level in mathematics?
   _____1. Yes
   _____2. No

8. What kind of tests did you use to measure such growth?
   _____1. Teacher made test
   _____2. Standardized-diagnostic
   _____3. Standardized-achievement
   _____4. Other; Specify:

III. Concerning conditions in schools (Use a separate sheet for each school)

1. Name of school _____

2. How many days each week do you work in this school? _____

3. Do you work in a regular classroom?
   _____1. Yes
   _____2. No; specify _____

4. How many class-size blackboards are there in this room? _____

5. Do you have adequate storage space in the room in which you work?
   _____1. Yes
   _____2. No

6. Who helped you schedule the groups with which you are now working?
   _____1. School administrator
   _____2. Field supervisor
   _____3. No one
   _____4. Other; specify: _____

7. What kind of communication do you have with classroom teachers?
   _____1. Conferences, regular
   _____2. Conferences, occasional
   _____3. Notes
   _____4. Other; specify: _____

8. Who made the first contact?
   _____1. Classroom teacher
   _____2. You

9. How many children in this school reached grade level and therefore dropped out of the corrective program? _____

10. Have any teachers complained about the children having to leave class to attend sessions with you?
    _____1. Yes
    _____2. No

11. Do you feel welcome in this school?
    _____1. Yes
    _____2. No

IV. Assistance

1. When did you receive any mathematics materials from Mrs. Stovall's office?
   _____1. Sept.
   _____2. Oct.
   _____3. Nov.
   _____4. Later; specify: _____

2. Were these early materials of any help to you?
   _____1. Yes
   _____2. Somewhat
   _____3. Not at all

3. On what date did you receive
   1. Kit A: _____
   2. Kit B: _____
   3. Kit C: _____

4. Concerning all the materials you have received, to what extent did you find them useful, i.e., appropriate for remedial or corrective work?

(Check the appropriate column)	Excellent	Good	Fair	Poor
1. Texts	___	___	___	___
2. Workbooks	___	___	___	___
3. Mimeographed sheets of exercises	___	___	___	___
4. Flannel board and cutouts	___	___	___	___
5. Rulers	___	___	___	___
6. Beads	___	___	___	___
7. Programmed Material((SRA)	___	___	___	___
8. Other physical objects; specify: _____	___	___	___	___

5. Did you receive enough of these materials for each group?

	Yes	No	Check if you would like more.
1. Texts	___	___	___
2. Workbooks	___	___	___
3. Programmed material (SRA)	___	___	___
4. Mimeographed sheets of exercises	___	___	___
5. Rulers	___	___	___
6. Cutouts	___	___	___
7. Beads or blocks	___	___	___
8. Other; specify: _____	___	___	___

6. How many times has your Field Supervisor visited you? _____

7. Have these visits been helpful to you?
   _____1. Very
   _____2. Somewhat
   _____3. Not at all

8. During such visits, did your supervisor
   _____1. Help individual students
   _____2. Discuss procedures with you
   _____3. Demonstrate part of a lesson
   _____4. Look at your plans
   _____5. Other; specify: _____

9. Which aspects of the conferences held at the Board of Education office were most helpful and instructive? (Lectures, demonstrations, etc.) List and evaluate each: _____

10. Which topics did you find were the most difficult to teach?
    1. Whole numbers: Add.____ Subt.____ Mult.____ Division____
    2. Fractions: Add.____ Subt.____ Mult.____ Division____
    3. Decimal Frac. Add.____ Subt.____ Mult.____ Division____
    4. Measure of Time _____
    5. Linear Measure _____
    6. Other; specify: _____

11. Please check if you plan to take any courses next summer to help you gain knowledge in
    _____1. Mathematics
    _____2. Methods of teaching mathematics
    _____3. Methods of teaching disadvantaged children
    _____4. Other; specify:_____

12. Have you found your preparation adequate for the work you are doing? _____

13. In which areas do you need more help?
    _____1. Mathematical concepts
    _____2. Methods of teaching
    _____3. Knowledge of use of materials
    _____4. Other; specify: _____
    _____5. No help needed

14. Would you like to work in this program next year? ____ Why?

15. Would you like to work in the same school(s)? _____ Why?

V. Summary (In answering, please consider length of sessions, materials, supervision, your professional preparation, etc.).
Recommendations: What, if any, problems existed which you believe can be corrected?

Commendations: What, if anything, made the program a good one?

Center for Urban Education
33 West 42nd Street
New York, New York 10036

PUPIL QUESTIONNAIRE FOR CORRECTIVE MATHEMATICS PROGRAM

Title I Evaluation
Evaluation Chairman: Dr. Anne Grossman

Name _____ Class Teacher _____

Grade _____ School _____

Please fill in the information asked for. We are trying to find out your feelings about school in general, and about arithmetic in particular. Answer the questions by placing a check mark in front of your answer.

1. I think school is

_____the greatest
_____all right
_____not so good

The things I like a whole lot are (you may check more than one):

2. _____reading
3. _____spelling
4. _____arithmetic
5. _____social studies
6. _____lunch
7. _____kids in my class
8. _____music

9. The think I like least is _____

The things I would like to do better in school are (you may check more than one):

10. _____reading
11. _____arithmetic
12. _____science
13. _____behavior or conduct
14. _____making friends

Think about yourself in school at the beginning of the year and today. Circle the number that best shows how you feel about each of the following:

		improved greatly	improved	remained the same	got worse
15.	Getting along with my classmates	1	2	3	4
16.	Behaving in school	1	2	3	4
17.	Doing the best I can to learn	1	2	3	4
18.	Volunteering to do arithmetic examples	1	2	3	4
19.	Liking arithmetic	1	2	3	4
20.	Getting arithmetic homework done	1	2	3	4
21.	Understanding the teacher when she teaches arithmetic	1	2	3	4
22.	Not giving up when the arithmetic gets too hard to do	1	2	3	4
23.	Marks in tests in arithmetic	1	2	3	4
24.	Getting correct answers in arithmetic	1	2	3	4
25.	Paying attention so I can learn	1	2	3	4
26.	Doing adding	1	2	3	4
27.	Doing subtraction or take away	1	2	3	4
28.	Doing multiplying or times	1	2	3	4
29.	Doing dividing	1	2	3	4
30.	Doing fractions	1	2	3	4

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Center for Urban Education
33 West 42nd Street
New York, New York 10036

Corrective Mathematics Services Project

Title I Evaluation

Evaluation Chairman - Dr. Anne Grossman

TEACHER QUESTIONNAIRE FOR SELECTED PUPILS

Pupil Name _____ Teacher Name _____
Grade _____ School _____
Sex _____1. Boy
_____2. Girl
Number of days absent _____October
_____April

Please fill in the information asked for. We are trying to find out your evaluations about these selected pupils in relation to school in general, and to arithmetic in particular. Answer the questions by placing a check mark in front of your response.

This pupil attends the following special programs:

_____1. Corrective mathematics
_____2. Corrective reading
_____3. After school study center; specify subject for help: _____
_____4 Other; specify: _____

5. This pupil likes school
_____1. Very much
_____2. Much
_____3. A little
_____4. Not at all

6. Does this pupil need special small group or individual assistance to learn?
_____1. Yes
_____2. No

Think about this pupil in school at the beginning of the year and today. For each item circle the number which represents the degree of change over the year.

		improved greatly	improved	remained the same	got worse
7.	Getting along with his classmates	1	2	3	4
8.	Behaving in school	1	2	3	4
9.	Doing the best he can to learn	1	2	3	4
10.	Volunteering to do arithmetic examples	1	2	3	4
11.	Liking arithmetic	1	2	3	4
12.	Getting arithmetic homework done	1	2	3	4
13.	Understanding the lesson as it is taught	1	2	3	4
14.	Not giving up when the arithmetic gets hard to do.	1	2	3	4

		improved greatly	improved	remained the same	got worse
15.	Marks in test in arithmetic	1	2	3	4
16.	Giving correct answers in arithmetic	1	2	3	4
17.	Paying attention so he can learn	1	2	3	4
18.	Ability to add	1	2	3	4
19.	Ability to subtract	1	2	3	4
20.	Ability to multiply	1	2	3	4
21.	Ability to divide	1	2	3	4
22.	Ability to work with fractions	1	2	3	4

ANSWER THE FOLLOWING ONLY FOR PUPILS IN CORRECTIVE MATHEMATICS CLASSES:

23. The corrective mathematics class helps him do his regular mathematics
_____1. greatly
_____2. a little
_____3. not at all

24. This pupil looks forward to going to the corrective mathematics classes
_____1. greatly
_____2. a little
_____3. not at all

APPENDIX C

Staff List

Dr. Anne S. Grossman, Evaluation Chairman
Assistant Professor
Department of Education
Hunter College

Dr. Anne Peskin
Assistant Professor
Department of Education
City College

Harry Ruderman,
Chairman
Department of Mathematics
Hunter College High School

Dr. Rita Senf
Senior Research Psychologist
Center for Urban Education